

1440X

SEQUENCE LISTING

(1) GENERAL INFORMATION:

(i) APPLICANT: Soppet, Daniel R  
 Yi, Li  
 Rosen, Craig A  
 Ruben, Steven

(ii) TITLE OF INVENTION: G-Protein Parathyroid Hormone receptor  
 HLTDG74

(iii) NUMBER OF SEQUENCES: 28

(iv) CORRESPONDENCE ADDRESS:

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 (C) CITY: Roseland  
 (D) STATE: NJ  
 (E) COUNTRY: USA  
 (F) ZIP: 07068-1739

(v) COMPUTER READABLE FORM:

(A) MEDIUM TYPE: 3.5 INCH DISKETTE  
 (B) COMPUTER: IBM PS/2  
 (C) OPERATING SYSTEM: MS-DOS  
 (D) SOFTWARE: WORD PERFECT 5.1

(vi) CURRENT APPLICATION DATA:

(A) APPLICATION NUMBER: 08/468,011  
 (B) FILING DATE: 06-JUN-1995  
 (C) CLASSIFICATION:

(viii) ATTORNEY/AGENT INFORMATION:

(A) NAME: MULLINS, J.G.  
 (B) REGISTRATION NUMBER: 33,073  
 (C) REFERENCE/DOCKET NUMBER: 325800-458 (PF201)

(ix) TELECOMMUNICATION INFORMATION:

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(2) INFORMATION FOR SEQ ID NO:1:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 2003 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

GTTTGCTCTG GGCAGCCAAG TTGGCATATT GGAAGCTTTT TCCGGGCTCT GGAGGAGGGT	60
CCCTGCTTCT TCCTACAGCC GTTCCGGGC ATG GCC TGG CTG GGG GCG TCG CTC	113
Met Ala Trp Leu Gly Ala Ser Leu	
1 5	

CAC GTC TGG GGT TGG CTA ATG CTC GGC AGC TGC CTC CTG GCC AGA GCC 161  
His Val Trp Gly Trp Leu Met Leu Gly Ser Cys Leu Leu Ala Arg Ala  
10 15 20

CAG CTG GAT TCT GAT GGC ACC ATC ACT ATA GAG GAG CAG ATT GTC CTT 209  
Gln Leu Asp Ser Asp Gly Thr Ile Thr Ile Glu Glu Gln Ile Val Leu  
25 30 35 40

GTG CTG AAA GCG AAA GTA CAA TGT GAA CTC AAC ATC ACA GCT CAA CTC 257  
Val Leu Lys Ala Lys Val Gln Cys Glu Leu Asn Ile Thr Ala Gln Leu  
45 50 55

CAG GAG GGA GAA GGT AAT TGT TTC CCT GAA TGG GAT GGA CTC ATT TGT 305  
Gln Glu Gly Glu Gly Asn Cys Phe Pro Glu Trp Asp Gly Leu Ile Cys  
60 65 70

TGG CCC AGA GGA ACA GTG GGG AAA ATA TCG GCT GTT CCA TGC CCT CCT 353  
Trp Pro Arg Gly Thr Val Gly Lys Ile Ser Ala Val Pro Cys Pro Pro  
75 80 85

TAT ATT TAT GAC TTC AAC CAT AAA GGA GTT GCT TTC CGA CAC TGT AAC 401  
Tyr Ile Tyr Asp Phe Asn His Lys Gly Val Ala Phe Arg His Cys Asn  
90 95 100

CCC AAT GGA ACA TGG GAT TTT ATG CAC AGC TTA AAT AAA ACA TGG GCC 449  
Pro Asn Gly Thr Trp Asp Phe Met His Ser Leu Asn Lys Thr Trp Ala  
105 110 115 120

AAT TAT TCA GAC TGC CTT CGC TTT CTG CAG CCA GAT ATC AGC ATA GGA 497  
Asn Tyr Ser Asp Cys Leu Arg Phe Leu Gln Pro Asp Ile Ser Ile Gly  
125 130 135

AAG CAA GAA TTC TGT GAA CGC CTC TAT GTA ATG TAT ACC GTT GGC TAC 545  
Lys Gln Glu Phe Cys Glu Arg Leu Tyr Val Met Tyr Thr Val Gly Tyr  
140 145 150

TCC ATC TCT TTT GGT TCC TTG GCT GTG GCT ATT CTC ATC ATT GGT TAC 593  
Ser Ile Ser Phe Gly Ser Leu Ala Val Ala Ile Leu Ile Ile Gly Tyr  
155 160 165

TTC AGA CGA TTG CAT TGC ACT AGG AAC TAT ATC CAC ATG CAC TTA TTT 641  
Phe Arg Arg Leu His Cys Thr Arg Asn Tyr Ile His Met His Leu Phe  
170 175 180

GTG TCT TTC ATG CTG AGA GCT ACA AGC ATC TTT GTC AAA GAC AGA GTA 689  
Val Ser Phe Met Leu Arg Ala Thr Ser Ile Phe Val Lys Asp Arg Val  
185 190 195 200

GTC CAT GCT CAC ATA GGA GTA AAG GAG CTG GAG TCC CTA ATA ATG CAG 737  
Val His Ala His Ile Gly Val Lys Glu Leu Glu Ser Leu Ile Met Gln  
205 210 215

GAT GAC CCA CAA AAT TCC ATT GAG GCA ACT TCT GTG GAC AAA TCA CAA 785  
Asp Asp Pro Gln Asn Ser Ile Glu Ala Thr Ser Val Asp Lys Ser Gln  
220 225 230

TAT ATC GGG TGC AAG ATT GCT GTT GTG ATG TTT ATT TAC TTC CTG GCT 833  
Tyr Ile Gly Cys Lys Ile Ala Val Val Met Phe Ile Tyr Phe Leu Ala  
235 240 245

ACA AAT TAT TAT TGG ATC CTG GTG GAA GGT CTC TAC CTG CAT AAT CTC 881  
Thr Asn Tyr Tyr Trp Ile Leu Val Glu Gly Leu Tyr Leu His Asn Leu  
250 255 260

ATC TTT GTG GCT TTC TTT TCG GAC ACC AAA TAC CTG TGG GGC TTC ATC 929  
Ile Phe Val Ala Phe Phe Ser Asp Thr Lys Tyr Leu Trp Gly Phe Ile  
265 270 275 280

TTG ATA GGC TGG GGG TTT CCA GCA GCA TTT GTT GCA GCA TGG GCT GTG 977  
Leu Ile Gly Trp Gly Phe Pro Ala Ala Phe Val Ala Ala Trp Ala Val  
285 290 295

GCA CGA GCA ACT CTG GCT GAT GCG AGG TGC TGG GAA CTT AGT GCT GGA 1025  
Ala Arg Ala Thr Leu Ala Asp Ala Arg Cys Trp Glu Leu Ser Ala Gly  
300 305 310

GAC ATC AAG TGG ATT TAT CAA GCA CCG ATC TTA GCA GCT ATT GGG CTG 1073  
Asp Ile Lys Trp Ile Tyr Gln Ala Pro Ile Leu Ala Ala Ile Gly Leu  
315 320 325

AAT TTT ATT CTG TTT CTG AAT ACG GTT AGA GTT CTA GCT ACC AAA ATC 1121  
Asn Phe Ile Leu Phe Leu Asn Thr Val Arg Val Leu Ala Thr Lys Ile  
330 335 340

TGG GAG ACC AAT GCA GTT GGG CAT GAC ACA AGG AAG CAA TAC AGG AAA 1169  
Trp Glu Thr Asn Ala Val Gly His Asp Thr Arg Lys Gln Tyr Arg Lys  
345 350 355 360

CTG GCC AAA TCG ACA CTG GTC CTG GTC CTA GTC TTT GGA GTG CAT TAC 1217  
Leu Ala Lys Ser Thr Leu Val Leu Val Leu Val Phe Gly Val His Tyr  
365 370 375

ATC GTG TTC GTG TGC CTG CCT CAC TCC TTC ACT GGG CTC GGG TGG GAG 1265  
Ile Val Phe Val Cys Leu Pro His Ser Phe Thr Gly Leu Gly Trp Glu  
380 385 390

ATC CGC ATG CAC TGT GAG CTC TTC TTC AAC TCC TTT CAG GGT TTC TTT 1313  
Ile Arg Met His Cys Glu Leu Phe Phe Asn Ser Phe Gln Gly Phe Phe  
395 400 405

GTG TCT ATC ATC TAC TGC TAC TGC AAT GGA GAG GTT CAG GCA GAG GTG 1361  
Val Ser Ile Ile Tyr Cys Tyr Cys Asn Gly Glu Val Gln Ala Glu Val  
410 415 420

AAG AAG ATG TGG AGT CGG TGG AAT CTC TCC GTG GAC TGG AAA AGG ACA 1409  
Lys Lys Met Trp Ser Arg Trp Asn Leu Ser Val Asp Trp Lys Arg Thr  
425 430 435 440

CCG CCA TGT GGC AGC CGC AGA TGC GGC TCA GTG CTC ACC ACC GTG ACG 1457  
Pro Pro Cys Gly Ser Arg Arg Cys Gly Ser Val Leu Thr Thr Val Thr  
445 450 455

CAC AGC ACC AGC AGC CAG TCA CAG GTG GCG GCA GCA CAC GCA TGG TGC 1505  
His Ser Thr Ser Ser Gln Ser Gln Val Ala Ala Ala His Ala Trp Cys  
460 465 470

TTA TCT CTG GCA AAG CTG CCA AGA TCG CCA GCA GAC AGC CTG ACA GCC 1553  
Leu Ser Leu Ala Lys Leu Pro Arg Ser Pro Ala Asp Ser Leu Thr Ala  
475 480 485

46

ACA TCA CTT TAC CTG GCT ATG TCT GGA GTA ACT CAG AGC AGG ACT GCC 1601  
Thr Ser Leu Tyr Leu Ala Met Ser Gly Val Thr Gln Ser Arg Thr Ala  
490 495 500

TCA CAC ACT CTC TCC ACG AGG AGC AAC AAG GAA GAT AGT GGG AGG CAG 1649  
Ser His Thr Leu Ser Thr Arg Ser Asn Lys Glu Asp Ser Gly Arg Gln  
505 510 515 520

AGA GAT GAT ATT CTA ATG GAG AAG CCT TCC AGG CCT ATG GAA TCT AAC 1697  
Arg Asp Asp Ile Leu Met Glu Lys Pro Ser Arg Pro Met Glu Ser Asn  
525 530 535

CCA GAC ACT GAA GGA TGACAAGGAG AAAGTGGAGG TGTTCTCTGA ATGGACATGT 1752  
Pro Asp Thr Glu Gly  
540

GTGGCTGACT TTCATGGGCT GGTCCAATGG CTGGTTGTGT GAGAGGGCTT GGCTGATACT 1812  
CCTATGCTTG AGCACAAAGG CTGAAAATTC AGTTAAGGTG TTAAGTTAATA ATAGTTTTTA 1872  
GGCTCCATGA ATTGGCTCCT GTAAATACTA ACGACATGAA AATGCAAGTG TCAATGGAGT 1932  
AGTTTATTAC CTTCTATTGG CATCAAGTTT TCCTCTAAAT TAATGTATGG TATTTGCTCT 1992  
GTGATTGTTC A 2003

(2) INFORMATION FOR SEQ ID NO:2:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 541 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

Met Ala Trp Leu Gly Ala Ser Leu His Val Trp Gly Trp Leu Met Leu  
5 10 15

Gly Ser Cys Leu Leu Ala Arg Ala Gln Leu Asp Ser Asp Gly Thr Ile  
20 25 30

Thr Ile Glu Glu Gln Ile Val Leu Val Leu Lys Ala Lys Val Gln Cys  
35 40 45

Glu Leu Asn Ile Thr Ala Gln Leu Gln Glu Gly Glu Gly Asn Cys Phe  
50 55 60

Pro Glu Trp Asp Gly Leu Ile Cys Trp Pro Arg Gly Thr Val Gly Lys  
65 70 75 80

Ile Ser Ala Val Pro Cys Pro Pro Tyr Ile Tyr Asp Phe Asn His Lys  
85 90 95

Gly Val Ala Phe Arg His Cys Asn Pro Asn Gly Thr Trp Asp Phe Met  
100 105 110

His Ser Leu Asn Lys Thr Trp Ala Asn Tyr Ser Asp Cys Leu Arg Phe  
115 120 125

47

Leu Gln Pro Asp Ile Ser Ile Gly Lys Gln Glu Phe Cys Glu Arg Leu  
 130 135 140  
 Tyr Val Met Tyr Thr Val Gly Tyr Ser Ile Ser Phe Gly Ser Leu Ala  
 145 150 155 160  
 Val Ala Ile Leu Ile Ile Gly Tyr Phe Arg Arg Leu His Cys Thr Arg  
 165 170 175  
 Asn Tyr Ile His Met His Leu Phe Val Ser Phe Met Leu Arg Ala Thr  
 180 185 190  
 Ser Ile Phe Val Lys Asp Arg Val Val His Ala His Ile Gly Val Lys  
 195 200 205  
 Glu Leu Glu Ser Leu Ile Met Gln Asp Asp Pro Gln Asn Ser Ile Glu  
 210 215 220  
 Ala Thr Ser Val Asp Lys Ser Gln Tyr Ile Gly Cys Lys Ile Ala Val  
 225 230 235 240  
 Val Met Phe Ile Tyr Phe Leu Ala Thr Asn Tyr Tyr Trp Ile Leu Val  
 245 250 255  
 Glu Gly Leu Tyr Leu His Asn Leu Ile Phe Val Ala Phe Phe Ser Asp  
 260 265 270  
 Thr Lys Tyr Leu Trp Gly Phe Ile Leu Ile Gly Trp Gly Phe Pro Ala  
 275 280 285  
 Ala Phe Val Ala Ala Trp Ala Val Ala Arg Ala Thr Leu Ala Asp Ala  
 290 295 300  
 Arg Cys Trp Glu Leu Ser Ala Gly Asp Ile Lys Trp Ile Tyr Gln Ala  
 305 310 315 320  
 Pro Ile Leu Ala Ala Ile Gly Leu Asn Phe Ile Leu Phe Leu Asn Thr  
 325 330 335  
 Val Arg Val Leu Ala Thr Lys Ile Trp Glu Thr Asn Ala Val Gly His  
 340 345 350  
 Asp Thr Arg Lys Gln Tyr Arg Lys Leu Ala Lys Ser Thr Leu Val Leu  
 355 360 365  
 Val Leu Val Phe Gly Val His Tyr Ile Val Phe Val Cys Leu Pro His  
 370 375 380  
 Ser Phe Thr Gly Leu Gly Trp Glu Ile Arg Met His Cys Glu Leu Phe  
 385 390 395 400  
 Phe Asn Ser Phe Gln Gly Phe Phe Val Ser Ile Ile Tyr Cys Tyr Cys  
 405 410 415  
 Asn Gly Glu Val Gln Ala Glu Val Lys Lys Met Trp Ser Arg Trp Asn  
 420 425 430  
 Leu Ser Val Asp Trp Lys Arg Thr Pro Pro Cys Gly Ser Arg Arg Cys  
 435 440 445  
 Gly Ser Val Leu Thr Thr Val Thr His Ser Thr Ser Ser Gln Ser Gln  
 450 455 460

Val Ala Ala Ala His Ala Trp Cys Leu Ser Leu Ala Lys Leu Pro Arg  
465 470 475 480

Ser Pro Ala Asp Ser Leu Thr Ala Thr Ser Leu Tyr Leu Ala Met Ser  
485 490 495

Gly Val Thr Gln Ser Arg Thr Ala Ser His Thr Leu Ser Thr Arg Ser  
500 505 510

Asn Lys Glu Asp Ser Gly Arg Gln Arg Asp Asp Ile Leu Met Glu Lys  
515 520 525

Pro Ser Arg Pro Met Glu Ser Asn Pro Asp Thr Glu Gly  
530 535 540

(2) INFORMATION FOR SEQ ID NO:3:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 23 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: not relevant  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

CAGCCGTCCC GGGCTTGGCC TGG

23

(2) INFORMATION FOR SEQ ID NO:4:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 27 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: not relevant  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

CCTCAGTGTC GACTTGTCAT CCTTCAG

27

(2) INFORMATION FOR SEQ ID NO:5:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 27 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: not relevant  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

GTTGGCATAT TGGAAGCTTT TTGCGGG

27

(2) INFORMATION FOR SEQ ID NO:6:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 28 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

CAGTTTCTAG ATGTCATCCT TCAGTGTC

28

(2) INFORMATION FOR SEQ ID NO:7:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 39 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: not relevant  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

TCCTACCCGG GCCGCCATCA TGGCCTGGCT GGGGGGCCT

39

(2) INFORMATION FOR SEQ ID NO:8:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 28 base pairs  
 (B) TYPE: nucleic acid  
 (C) STRANDEDNESS: not relevant  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA (genomic)

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

CAGTTTCTAG ATGTCATCCT TCAGTGTC

28

(2) INFORMATION FOR SEQ ID NO:9:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 60 amino acids  
 (B) TYPE: amino acid  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

Ile Met Gln Asp Asp Pro Gln Asn Ser Ile Glu Ala Thr Ser Val  
                  5                  10  
Asp Lys Ser Gln Tyr Ile Gly Cys Lys Ile Ala Val Val Met Phe  
                  20                  25                  30  
Ile Tyr Phe Leu Ala Thr Asn Tyr Tyr Trp Ile Leu Val Glu Gly  
                  35                  40                  45

50

Leu Tyr Leu His Asn Leu Ile Phe Val Ala Phe Phe Ser Asp Thr  
 50 55 60

(2) INFORMATION FOR SEQ ID NO:10:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 60 amino acids  
 (B) TYPE: amino acid  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

C<sup>2</sup>  
 Ile Thr Glu Glu Glu Leu Arg Ala Phe Thr Glu Pro Pro Pro Ala  
 5 10 15  
 Asp Lys Ala Gly Phe Val Gly Cys Arg Val Ala Val Thr Val Phe  
 20 25 30  
 Leu Tyr Phe Leu Thr Thr Asn Tyr Tyr Trp Ile Leu Val Glu Gly  
 35 40 45  
 Leu Tyr Leu His Ser Leu Ile Phe Met Ala Phe Phe Ser Glu Lys  
 50 55 60

(2) INFORMATION FOR SEQ ID NO:11:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 60 amino acids  
 (B) TYPE: amino acid  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

Lys Tyr Leu Trp Gly Phe Ile Leu Ile Gly Trp Gly Phe Pro Ala  
 5 10 15  
 Ala Phe Val Ala Ala Trp Ala Val Ala Arg Ala Thr Leu Ala Asp  
 20 25 30  
 Ala Arg Cys Trp Glu Leu Ser Ala Gly Asp Ile Lys Trp Ile Tyr  
 35 40 45  
 Gln Ala Pro Ile Leu Ala Ala Ile Gly Leu Asn Phe Ile Leu Phe  
 50 55 60

(2) INFORMATION FOR SEQ ID NO:12:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 60 amino acids  
 (B) TYPE: amino acid  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

Lys Trp Leu Trp Gly Phe Thr Leu Phe Gly Trp Gly Leu Pro Ala  
 5 10 15  
 Val Phe Val Ala Val Trp Val Thr Val Arg Ala Thr Leu Ala Asn



	20		25		30									
Thr	Glu	Cys	Trp	Asp	Leu	Ser	Ser	Gly	Asn	Lys	Lys	Trp	Ile	Ile
				35					40					45
Gln	Val	Pro	Ile	Leu	Ala	Ala	Ile	Val	Val	Asn	Phe	Ile	Leu	Phe
				50					55					60

(2) INFORMATION FOR SEQ ID NO:13:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 50 amino acids  
 (B) TYPE: amino acid  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

Leu Asn Thr Val Arg Val Leu Ala Thr Lys Ile Trp Glu Thr Asn  
                                   5                                  10                                  15  
 Ala Val Gly His Asp Thr Arg Lys Gln Tyr Arg Lys Leu Ala Lys  
                                   20                                  25                                  30  
 Ser Thr Leu Val Leu Val Leu Phe Gly Val His Ile Val Phe Val  
                                   35                                  40                                  45  
 Cys Leu Pro His Ser  
                                   50

(2) INFORMATION FOR SEQ ID NO:14:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 52 amino acids  
 (B) TYPE: amino acid  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

Ile Asn Ile Ile Arg Val Leu Ala Thr Lys Leu Arg Glu Thr Asn  
                                   5                                  10                                  15  
 Ala Gly Arg Cys Asp Thr Arg Gln Gln Tyr Arg Lys Leu Leu Lys  
                                   20                                  25                                  30  
 Ser Thr Leu Val Leu Met Pro Leu Phe Gly Val His Tyr Ile Val  
                                   35                                  40                                  45  
 Phe Met Ala Thr Pro Tyr Thr  
                                   50

(2) INFORMATION FOR SEQ ID NO:15:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 60 amino acids  
 (B) TYPE: amino acid  
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

Glu	Gly	Asn	Cys	Phe	Pro	Glu	Trp	Asp	Gly	Leu	Ile	Cys	Trp	Pro
				5					10					15
Arg	Gly	Thr	Val	Gly	Lys	Ile	Ser	Ala	Val	Pro	Cys	Pro	Pro	Tyr
				20					25					30
Ile	Tyr	Asp	Phe	Asn	His	Lys	Gly	Val	Ala	Phe	Arg	His	Cys	Asn
				35					40					45
Pro	Asn	Gly	Thr	Trp	Asp	Phe	Met	His	Ser	Leu	Asn	Lys	Thr	Trp
				50					55					60

(2) INFORMATION FOR SEQ ID NO:16:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 60 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

2

Asp	Gly	Phe	Cys	Leu	Pro	Glu	Trp	Asp	Asn	Ile	Val	Cys	Trp	Pro
				5					10					15
Ala	Gly	Val	Pro	Gly	Lys	Val	Val	Ala	Val	Pro	Cys	Pro	Asp	Tyr
				20					25					30
Ile	Tyr	Asp	Phe	Asn	His	Lys	Gly	Arg	Ala	Tyr	Arg	Arg	Cys	Asp
				35					40					45
Ser	Asn	Gly	Ser	Trp	Glu	Leu	Val	Pro	Gly	Asn	Asn	Arg	Thr	Trp
				50					55					60

(2) INFORMATION FOR SEQ ID NO:17:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 10 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

Ala	Asn	Tyr	Ser	Asp	Cys	Leu	Arg	Phe	Leu
				5					10

(2) INFORMATION FOR SEQ ID NO:18:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 10 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

Ala	Asn	Tyr	Ser	Glu	Cys	Val	Lys	Phe	Leu
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## (2) INFORMATION FOR SEQ ID NO:19:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 60 amino acids  
 (B) TYPE: amino acid  
 (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: protein

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

Lys Gln Glu Phe Cys Glu Arg Leu Tyr Val Met Tyr Thr Val Gly  
                   5                  10                  15  
 Tyr Ser Ile Ser Phe Gly Ser Leu Ala Val Ala Ile Leu Ile Ile  
                   20                  25                  30  
 Gly Tyr Phe Arg Arg Leu His Cys Thr Arg Asn Tyr Ile His Met  
                   35                  40                  45  
 His Leu Phe Val Ser Phe Met Leu Arg Ala Thr Ser Ile Phe Val  
                   50                  55                  60

## (2) INFORMATION FOR SEQ ID NO:20:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 60 amino acids  
 (B) TYPE: amino acid  
 (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: protein

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

Glu Arg Glu Val Phe Asp Arg Leu Gly Met Ile Tyr Thr Val Gly  
                   5                  10                  15  
 Tyr Ser Ile Ser Leu Gly Ser Leu Thr Val Ala Val Leu Ile Leu  
                   20                  25                  30  
 Gly Tyr Phe Arg Arg Leu His Cys Thr Arg Asn Tyr Ile His Met  
                   35                  40                  45  
 His Leu Phe Val Ser Phe Met Leu Arg Ala Val Ser Ile Phe Ile  
                   50                  55                  60

## (2) INFORMATION FOR SEQ ID NO:21:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 amino acids  
 (B) TYPE: amino acid  
 (D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: protein

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

Lys Asp Arg Val Val His Ala His Ile Gly Val Lys Glu Leu Glu  
                   5                  10                  15  
 Ser Leu Ile Met Gln Asp  
                   20

(2) INFORMATION FOR SEQ ID NO:22:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

Lys Asp Ala Val Leu Tyr Ser Gly Val Ser Thr Asp Glu Ile Glu  
                    5                    10                    15  
Arg Ile Thr Glu Glu Glu  
                    20

(2) INFORMATION FOR SEQ ID NO:23:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 59 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

Thr Gly Leu Gly Trp Glu Ile Arg Met His Cys Glu Leu Phe Phe  
                    5                    10                    15  
Asn Ser Phe Gln Gly Phe Phe Val Ser Ile Ile Tyr Cys Tyr Cys  
                    20                    25                    30  
Asn Gly Glu Val Gln Ala Glu Val Lys Lys Met Trp Ser Arg Trp  
                    35                    40                    45  
Asn Leu Ser Val Asp Trp Lys Arg Thr Pro Pro Cys Gly Ser  
                    50                    55

(2) INFORMATION FOR SEQ ID NO:24:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 59 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

Ser Gly Ile Leu Trp Gln Val Gln Met His Tyr Glu Met Leu Phe  
                    5                    10                    15  
Asn Ser Phe Gln Gly Phe Phe Val Ala Ile Ile Tyr Cys Phe Cys  
                    20                    25                    30  
Asn Gly Glu Val Gln Ala Glu Ile Lys Lys Ser Trp Ser Arg Trp  
                    35                    40                    45  
Thr Leu Ala Leu Asp Phe Lys Arg Lys Ala Arg Ser Gly Ser  
                    50                    55

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(2) INFORMATION FOR SEQ ID NO:25:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 37 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

Ala Gln Leu Asp Ser Asp Gly Thr Ile Thr Ile Glu Glu Gln Ile  
                  5                  10                  15  
Val Leu Val Leu Lys Ala Lys Val Gln Cys Glu Leu Asn Ile Thr  
                  20                  25                  30  
Ala Gln Leu Gln Gln Gly Glu  
                  35

(2) INFORMATION FOR SEQ ID NO:26:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 37 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

Ala Leu Val Asp Ala Asp Asp Val Ile Thr Lys Glu Glu Gln Ile  
                  5                  10                  15  
Ile Leu Leu Arg Asn Ala Gln Ala Gln Cys Glu Gln Arg Leu Lys  
                  20                  25                  30  
Glu Val Leu Arg Val Pro Glu  
                  35

(2) INFORMATION FOR SEQ ID NO:27:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 23 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

Ile Ser Gly Lys Ala Ala Lys Ile Ala Ser Arg Gln Pro Asp Ser  
                  5                  10                  15  
His Ile Thr Leu Pro Gly Tyr Val  
                  20

(2) INFORMATION FOR SEQ ID NO:28:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 23 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

Leu Ser Pro Arg Leu Ala Pro Gly Ala Gly Ala Ser Ala Asn Gly  
                  5                  10                  15  
His His Gln Leu Pro Gly Tyr Val  
                  20

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